



## LEVENTHAL SENTER &amp; LERMAN PLLC

February 6, 2003

RAUL R. RODRIGUEZ  
(202) 416-6760

E-MAIL  
RRDRIGUEZ@LSL-LAW.COM

RECEIVED

FEB - 6 2003

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

**Re: Oral Ex Parte Presentation; ET Docket 98-153**

Dear Ms. Dortch:

This letter provides notice that Ms. Amy Mehlman of Capitol Coalitions and undersigned counsel, representing the U.S. GPS Industry Council, and Mr. Dean Brenner of Crispin & Brenner, representing QUALCOMM, met today with Mr. Sam Feder, Legal Advisor to Commissioner Martin, to discuss matters on reconsideration in the referenced proceeding. More specifically, we urged the Commission not to adopt any changes to the existing rules governing the use of Ultra-wideband devices that would allow greater emissions into the GPS band. We provided Mr. Feder with a copy of the attached written ex parte presentation already a matter of record in this proceeding.

An original and one copy of this letter are being submitted for inclusion in the record of this proceeding.

Respectfully submitted,

Raul R. Rodriguez  
Counsel to the U.S. GPS Industry Council

RRR:rjc  
Attachment

cc: (by email w/o attachment): Mr. Sam Feder

No. of Copies rec'd 0+1  
List A B C D E

January 28, 2003

RAUL R. RODRIGUEZ  
(202) 416-5760

E-MAIL  
RRODRIGUEZ@LSL-LAW.COM

**RECEIVED**

JAN 28 2003

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W., Room TW-B204  
Washington, DC 20554

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

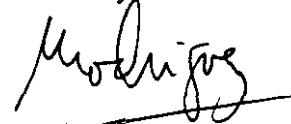
Re: **CORRECTED Written Ex Parte Presentation in ET Docket No. 98-153**

Dear Ms. Dortch:

Pursuant to Section 1.1206 of the Commission's Rules 47 C.F.R. § 1.1206, please find two copies of a January 27, 2003 written *ex parte* presentation enclosed for inclusion in the record of the above-referenced proceeding. The presentation, which was made on behalf of the 31 companies and associations identified in the letterhead of the enclosure hereto, was transmitted electronically and/or by hand to the office of Chairman Powell, the offices of Commissioners Abemathy, Copps, Martin, and Adelstein, and to officials within the Commission's Office of Engineering and Technology. The list of recipients within the Commission is shown on page 7 of the enclosure.

Please direct any questions concerning this matter to the undersigned.

Sincerely,



Raul R. Rodriguez

RRR:rlp

UNITED STATES

*Air Transport Association of America • American Airlines Inc. •  
American Medical Response • ARINC • AT&T Wireless Services •  
Deere & Co. • Delta Air Lines, Inc. • eRide, Inc. • Garmin International, Inc. •  
General Aviation Manufacturers Association • Global Locate, Inc. •  
Lockheed Martin Corporation • Multispectral Solutions, Inc. •  
National Business Aviation Association, Inc. • National Ocean Industries Association •  
NavCom Technology, Inc. • Nortel Networks, Inc. •  
Northwest Air Lines, Inc. • Omnistar, Inc. •  
PanAmSat Corporation • QUALCOMM Incorporated • Raytheon Company •  
Rockwell Collins, Inc. • SiRF Technology, Inc. • Sirius Satellite Radio, Inc. •  
Spatial Technologies Industry Association • Sprint Corporation •  
Tendler Cellular, Inc. • Trimble Navigation Ltd. • United Air Lines •  
United States GPS Industry Council*

January 27, 2003

The Honorable Michael Gallagher  
Deputy Assistant Secretary of Commerce for Communications  
And Information  
National Telecommunications and  
Information Administration (NTIA)  
Herbert Clark Hoover Building  
14<sup>th</sup> Street and Constitution Avenue, N.W.  
Washington, D.C. 20230

**Re: ET Docket No. 98-153 (FCC Ultra-Wideband Proceeding)**

Dear Mr. Gallagher:

The signatory companies and associations write to bring to your attention the technical and regulatory treatment being developed in Europe by CEPT for the potential introduction of Ultra-wideband (UWB) devices and networks into the European radio frequency spectrum. Although these CEPT emission limits have only recently been introduced into ITU-R studies, the CEPT approach evidences both prudence and support for introducing **UWB** technology. This approach protects public safety and a variety of commercial and government applications while preserving the potential of existing digital services and technologies to continue to innovate. We believe that this approach evinces a reasoned balance of important policy goals and should be of value and interest to NTIA in the ongoing intergovernmental discussions on the implementation and review of the regulatory approach to UWB adopted by the FCC last year.

The CEPT approach takes into account the technical and practical parameters of **UWB** technology while also recognizing the need to “offer more interference protection to critical sensitive services operating below 3.1 GHz” (e.g., they propose a slope mask and extending the -75 dBm/MHz at 1660 in a flat line below 960 MHz). See Attachment A. CEPT also concludes that UWB cannot fully use a staircase spectrum mask as developed by the FCC, and that an additional advantage of a slope mask is that such a mask does not reduce the performance of UWB products. Finally, we note that the proposed CEPT emission mask, in anticipation that 98% of UWB applications will be in communications

and measurement systems, provides greater protection *to* safety-of-life systems in frequencies at and below 1 GHz than does the mask adopted by the FCC.

We recognize that the CEPT approach *to* UWB remains under development, and acknowledge that it may not adequately address all concerns that existing radiocommunication services have with **UWB** technology in frequency bands between **3.1 GHz** and **10.6GHz**. At the same time, however, we also recognize that CEPT has *arrived* at these conclusions through a deliberative process that focuses on the attributes and aptitudes of UWB technology. We believe that the CEPT slope mask, at least in its current iteration, is the right approach to take below **3.1 GHz**, because it is fundamentally objective and avoids the pitfalls of a political debate conducted in an information vacuum. Further work on the CEPT approach may be required *to* adequately protect radiocommunication services in certain bands above **3.1 GHz**. The **U.S.** and the world are just now beginning *to* climb the steep educational curve that is associated with the recent emergence of UWB technology, and there is not yet sufficient meaningful operational experience with actual UWB devices to fully understand how this technology affects existing technologies and systems. Until we can be certain that **UWB** applications will not interfere with safety-of-life systems, an objective approach that introduces new technologies without compromising safety or the ability of existing digital technologies and services *to* continue to innovate is what is needed.

***It would be most unfortunate for the United States, and particularly the FCC, under these circumstances, to use the pending reconsideration process in ET Docket No. 98-153 to relax the restrictions and emissions limits below 3.1 GHz.*** The objective evidence to support the conclusion that such a change will not interfere with critical, safety-of-life systems and existing digital services has not been provided to the FCC. Consequently, we strongly urge no change in the existing UWB rules:

- No communications below **3.1 GHz** (licensed/unlicensed; indoor/outdoor)
- No relaxation of existing emission limits, including GPS (**-105 dBW/MHz**)
- Protect the noise floor in the radiofrequency bands in the National Airspace (NAS)
- No expansion of eligibility below **3.1 GHz** *to* use different categories of UWB devices

We note that several Canadian contributions submitted *to* the ITU-R Task Group 1/8 recognize that the susceptibility threshold of several mobile communication services is comparable to the GPS receiver susceptibility baseline that the FCC used in developing the emission limits in the FCC First Report and Order. *See* Attachment B. Canada recognizes that the noise floor of these digital services needs protection at levels that preserve the ability of these service providers to continue *to* innovate and compete domestically as well as internationally. While Europe's balanced approach will ensure that the EU will reap maximum economic benefit from the ongoing digital innovation of all sectors, and including UWB, the **U. S.** may well find itself at a competitive disadvantage from raising the noise floor in all sectors of its digital services. We strongly encourage NTIA to reflect upon this development and take this into account in any decisions on UWB emission limits.

Finally, it is important to note that UWB emissions universally increase the noise floor for all applications: indoor, outdoors, the military, aviation, public safety (e.g. E911), commercial, and consumers. In particular, to adequately protect GPS applications, UWB emission limits should not be raised above the already established  $-105.3 \text{ dBW/MHz}$  ( $-75.3 \text{ dBm/MHz}$ ). This limit protects the GPS noise floor and is consistent with that derived by the GPS Joint Program Office (see Attachment C).

The consequences of this issue are far too important for the United States. In light of the extensive international activity begun by the ITU-R Task Group 1/8, any attempts to modify the existing FCC limits below 3.1 GHz are, at a minimum premature.

Respectfully submitted,

By: \_\_\_\_\_/s/  
Air Transport Association of America, Inc.  
David A. Berg  
Assistant General Counsel  
1301 Pennsylvania Avenue, N.W., Suite 1100  
Washington, D.C. 2004-1707

\_\_\_\_\_  
American Airlines Inc.  
Rich Farr  
Manager Radio, AA SOC/Flight Operations  
3900 N. Mingo Road, MD 212  
Tulsa, OK 741 16

By: \_\_\_\_\_/s/  
American Medical Response  
Denis Jackson  
Vice President. Bay Operations/Communications  
640 143rd Avenue  
San Leandro, CA 94578

By: \_\_\_\_\_/s/  
ARINC  
Kris Hutchison  
Senior Director, Frequency Management  
2551 Riva Road  
Annapolis. MD 21401

\_\_\_\_\_  
AT&T Wireless Services  
David Wye  
Director. Spectrum Policy  
1150 Connecticut Avenue, N.W., Suite 400  
Washington, D.C. 20036

\_\_\_\_\_  
Deere & Co.  
James D. Litton  
Director, Communications & Navigations Systems  
One John Deere Road  
Moline, IL 61265

By: \_\_\_\_\_/s/  
Delta Air Lines, Inc.  
Ira G. Pearl  
Director, Flight Operations Technical Support  
Dept. 086, P.O. Box 20706  
Atlanta, GA 30320-6001

By: \_\_\_\_\_/s/  
eRide, Inc.  
Arthur Woo  
President and CEO  
3540 California Street  
San Francisco, CA 94118

By: \_\_\_\_\_/s/  
Garmin International, Inc.  
Andrew R. Etkind  
General Counsel  
1200 East 151st Street  
Olathe, KS 66062

By: \_\_\_\_\_/s/  
General Aviation Manufacturers Association  
Ron Swanda  
Vice President Operations  
1400 K Street, N.W., Suite 801  
Washington, D.C. 20005

By: \_\_\_\_\_  
Global Locate, Inc.  
Scott Pomerantz  
President and CEO  
3190 South Bascom Avenue  
San Jose, CA 95124

By: \_\_\_\_\_/s/  
Lockheed Martin Corporation  
Gerald Musarra  
Vice President, Trade and Regulatory Affairs  
Crystal Square No. 2, Suite 403  
1725 Jefferson Davis Highway  
Arlington, VA 22202

By: \_\_\_\_\_/s/  
Multispectral Solutions, Inc.  
Robert J. Fontana, Ph.D.  
President  
20300 Century Boulevard  
Germantown, MD 20874

\_\_\_\_\_  
National Business Aviation Association, Inc.  
William H. Stine  
Director, International Operations  
1200 Eighteenth Street, N.W.  
Washington, D.C. 20036-2527

By: \_\_\_\_\_/s/  
National Ocean Industries Association  
Kim Harb  
Director, Government Affairs  
1120 G Street, N.W., Suite 900  
Washington, D.C. 20005

\_\_\_\_\_  
NavCom Technology, Inc.  
James D. Litton  
President and Chief Executive Officer  
123 West Torrance Boulevard, Suite 101  
Redondo Beach, CA 90277

By: \_\_\_\_\_/s/  
Nortel Networks, Inc.  
Raymond L. Strassburger, Esq.  
Vice President, Global Government Relations  
Telecom, Internet and Advanced Technology Policy  
801 Pennsylvania Avenue, N.W., Suite 700  
Washington, DC 20004

By: \_\_\_\_\_/s/  
Northwest Air Lines, Inc.  
Paul Anderson  
Manager Communications  
5101 Northwest Drive  
St. Paul, MN 55111

\_\_\_\_\_  
Omnistar, Inc.  
John Waits  
President  
8200 Westglenn  
Houston, TX 77063

By:                     /s/                      
PanAmSat Corporation  
Kalpak Gude  
VP Gov't & Regulatory Affairs & Associate General Counsel  
1801 K Street, N.W., Suite 440  
Washington, D.C. 20006

By:                     /s/                      
QUALCOMM Incorporated  
Dean R. Brenner  
Counsel  
Crispin & Brenner, P.L.L.C.  
1156 15th Street, N.W., Suite 1105  
Washington, D.C. 20005

By:                     /s/                      
Raytheon Company  
Stephen G. Moran  
Director, Civil Space Programs  
1100 Wilson Boulevard  
Arlington, VA 22209

By:                     /s/                      
Rockwell Collins, Inc.  
Linda C. Sadler  
Director, Federal Affairs  
1300 Wilson Boulevard, Suite 200  
Arlington, VA 22209

By:                     /s/                      
SiRF Technology, Inc.  
Kanwar Chadha  
Founder  
148 E. Brokaw Road  
San Jose, CA 95112

By:                     /s/                      
Sirius Satellite Radio, Inc.  
Patrick L. Donnelly  
Executive Vice President & General Counsel  
1221 Avenue of the Americas  
New York, NY 10020

By:                     /s/                      
Spatial Technologies Industry Association  
Frederic W. Corle II  
President  
901 15th Street, N.W.  
Washington, D.C. 20005



By: \_\_\_\_\_/s/  
Sprint Corporation  
Luisa L. Lancetti  
Vice President, PCS Regulatory Affairs  
401 9th Street, N.W., Suite 400  
Washington, D.C. 20004

\_\_\_\_\_  
Tendler Cellular, Inc.  
Bob Tendler  
Chairman  
65 Atlantic Avenue  
Boston, MA 02110

By: \_\_\_\_\_/s/  
Trimble Navigation, Ltd.  
Ann Ciganer  
Vice President, Strategic Policy  
645 North Mary Avenue  
Sunnyvale, CA 94086

\_\_\_\_\_  
United Airlines  
Capt. Joe Bums  
Director, Flight Standards and Technology  
7401 E. Martin Luther King Blvd.  
Denver, CO 80207

By: \_\_\_\_\_/s/  
United States GPS Industry Council  
Charles Trimble  
Chairman  
1101 Connecticut Avenue, N.W., Ste. 1200  
Washington, D.C. 20036

Enclosures: Attachment A: FCC UWB Emission Limits and Proposed CEPT  
Emission Mask For Communication and Measurement Systems  
(Indoor/Outdoor)  
Attachment B: Mobile System Parameters  
Attachment C: Noise Floor Analysis

cc (w/ encl.): Hon. Michael K. Powell, Chairman, FCC  
Hon. Kathleen Q. Abemathy, Commissioner, FCC  
Hon. Michael J. Copps, Commissioner, FCC  
Hon. Kevin J. Martin, Commissioner, FCC  
Hon. Jonathan S. Adelstein, Commissioner, FCC  
Ed Thomas, FCC Office of Engineering and Technology  
Julius Knapp, FCC Office of Engineering and Technology  
Karen Rackley, FCC Office of Engineering and Technology  
John Reed, FCC Office of Engineering and Technology  
Ron Chase, FCC Office of Engineering and Technology

## ATTACHMENT A

### FCC UWB EMISSION LIMITS AND PROPOSED CEPT EMISSION MASK FOR AND MEASUREMENT SYSTEMS (INDOORS) [Switzerland 1-8/32-E]

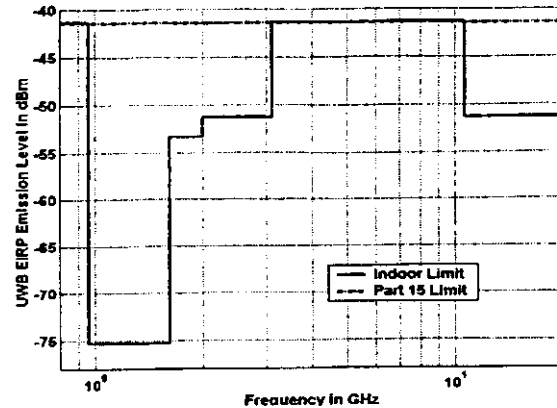


FIGURE 1

FCC UWB emissions limits for indoor communication and measurement systems. Units with center frequencies greater than 3.1 GHz

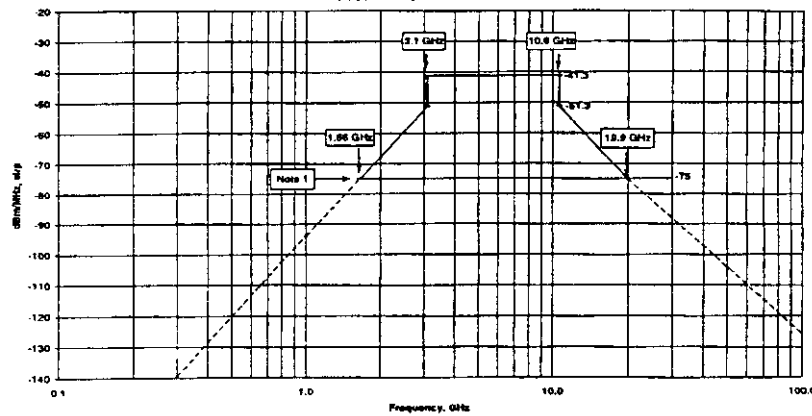


FIGURE 3  
Indoor CEPT  
slope mask

#### 3.3 Modified FCC Masks

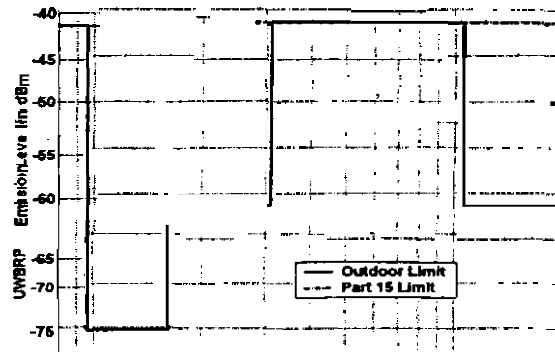
The CEPT SE24 modified the new FCC UWB masks (s.3.2) below 960 MHz to a flat line by -75 dBm/MHz. This modification was proposed in order to protect the numerous radiocommunication applications in Europe that are centered at frequencies below 1 GHz.

#### 3.1 Proposed CEPT slope mask

FCC issued a staircase spectrum mask limit for radiated power density. UWB cannot utilize the staircase mask fully and CEPT therefore proposes to use a sloped mask instead. The advantage of this mask is: a) a slope offers more interference protection to critical sensitive services operating below 3.1 GHz and above 10.6 GHz; b) a slope itself does not reduce the performance of UWB products. At low frequencies, an attenuation roll-off for the proposed mask meets FCCs requirement at 3.1 and 1.66 GHz with a radiated power density limits of -51.3 dBm/MHz (indoors); -61 dBm/MHz (outdoors) and -75 dBm/MHz respectively.

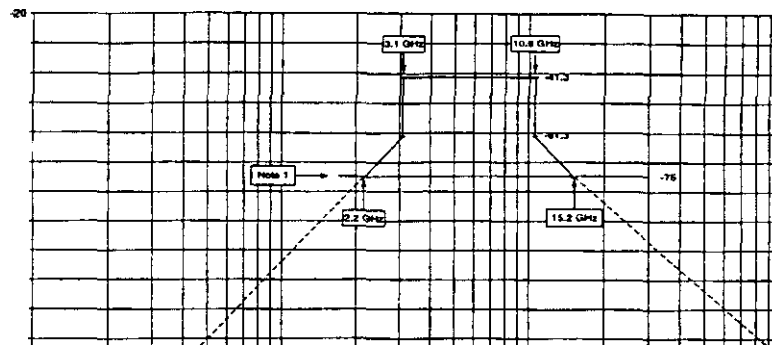
# **ATTACHMENT A** **(Continued)**

## **FCC UWB EMISSION LIMITS AND PROPOSED CEPT EMISSION MASK FOR COMMUNICATION AND MEASUREMENT SYSTEMS (OUTDOORS)** [Switzerland: 1-8/32-E]



**FIGURE 2**

FCC UWB emissions limits for outdoor communication and measurement systems. Units with center frequencies greater than 3.1 GHz.



# **ATTACHMENT B** **MOBILE SYSTEM PARAMETERS**

1/19/03							
<b>Items</b>	<b>Source</b>	<b>Title</b>	<b>Additional Excerpts</b>				
9	Canada	<b>Proposed Text and Structure of A</b>					
	1-8/26-E	<b>Recommendation and A Report on</b>		<b>Mobile System Parameters</b>		(Page 8)	
		<b>Compatibility Between Devices Using</b>	<u>System</u>	<u>Carrier Freq/MHz</u>	<u>Bandwidth</u>	<u>System Sensitivity</u>	<u>Sensitivity</u>
		<b>UWB Technology and</b>			(MHz)	(dBm)	(dBm)
		<b>Radiocommunication Services</b>	DECT	1880	1.728	-97	-99.4
			GSM	950	0.2	-108	-101
			CDMA-2000 1X	1900	1.25	-110	-111
			UMTS/WCDMA FDD	2100	3.84	-105	-110.8
11	Canada	<b>Compatibility Between Receivers</b>					
	1-8/33-E	<b>of the Mobile Communications</b>		<b>Mobile System Parameters</b>		(Page 5)	
		<b>Services and Emissions By UWB</b>	<u>System</u>	<u>Carrier Freq/MHz</u>	<u>Bandwidth</u>	<u>System Sensitivity</u>	<u>Sensitivity</u>
		<b>Devices</b>			(MHz)	(dBm)	(dBm)
			DECT	1880	1.728	-97	-99.4
			GSM	950	0.2	-108	-101
			CDMA-2000 1X	1900	1.25	-110	-111
			UMTS/WCDMA FDD	2100	3.84	-105	-110.8
			GPS L1	1500	10		-117.5

## ATTACHMENT C NOISE FLOOR ANALYSIS

Thermal noise is the correct approach to accounting for noise factors because it includes both the ambient noise temperature and the receiver noise temperature. They interact with each other and not in a linear way. The receiver noise temperature softens the effect of the ambient noise and sometimes dominates. One of reasons for the higher ambient noise indoors is the fact that the antenna is looking at the warm walls, instead of the cold sky. Walls are **3** or more times warmer (in absolute temperature) than the sky, resulting in **4** to **5** dB more ambient noise.

The equation for  $N_0$  in **FCC** TRB report is not correct for the noise floor. The equation only describes “receiver” noise – it does not include ambient source noise. The correct equation for thermal noise density, in dBW/Hz is

$$N_0 \approx 10 \log_{10} \left[ kT_s + kT_0 (10^{1NF} - 1) \right]$$

where  $T_s$  is the source temperature in K,  $k$  is Boltzman’s constant ( $1.38 \times 10^{-23}$  Watts/K-Hz),  $T_0$  is **290** K, and **NF** is the receiver noise figure in dB.<sup>1</sup> This source temperature is usually taken to be 100 K using an omni-directional antenna outdoors, accounting for ground clutter. This results in a source ambient thermal noise equal to **-118.6 dBm/MHz**. The source noise temperature would be **290** K indoors. When using a horn antenna such as was used in the FCC TRB report, pointed at the sky, the source temperature could be much lower because “ground clutter” is essentially eliminated. This explains ambient noise measured at **-122 dBm/MHz**. However, if the **sun** is located in a narrow beam, the source temperature could be much higher.

For aviation applications, as derived by RTCA, a noise figure of about **4** dB is used as typical for including pre-filtering and lightning protection losses, thus the noise density (**-111.5 dBm/MHz**) is 7.1 dB higher than the ambient source noise density.

One might argue that for indoor and outdoor handheld or automotive GPS receivers, a lower noise figure is possible due to less stringent protection requirements than aviation. However, indoors, the lower noise figure is offset by a higher source temperature. An increase in source temperature of **2.9** (**290** K instead of 100K) would require the noise figure to be reduced to **1.82** to achieve the same overall thermal density. This is quite low, so the conclusion is that the assumed noise density (**-111.5 dBm/MHz**) is universal.

The above equation does not include ambient radio noise (interference). The total noise density, including this interference (such as UWB emissions), is

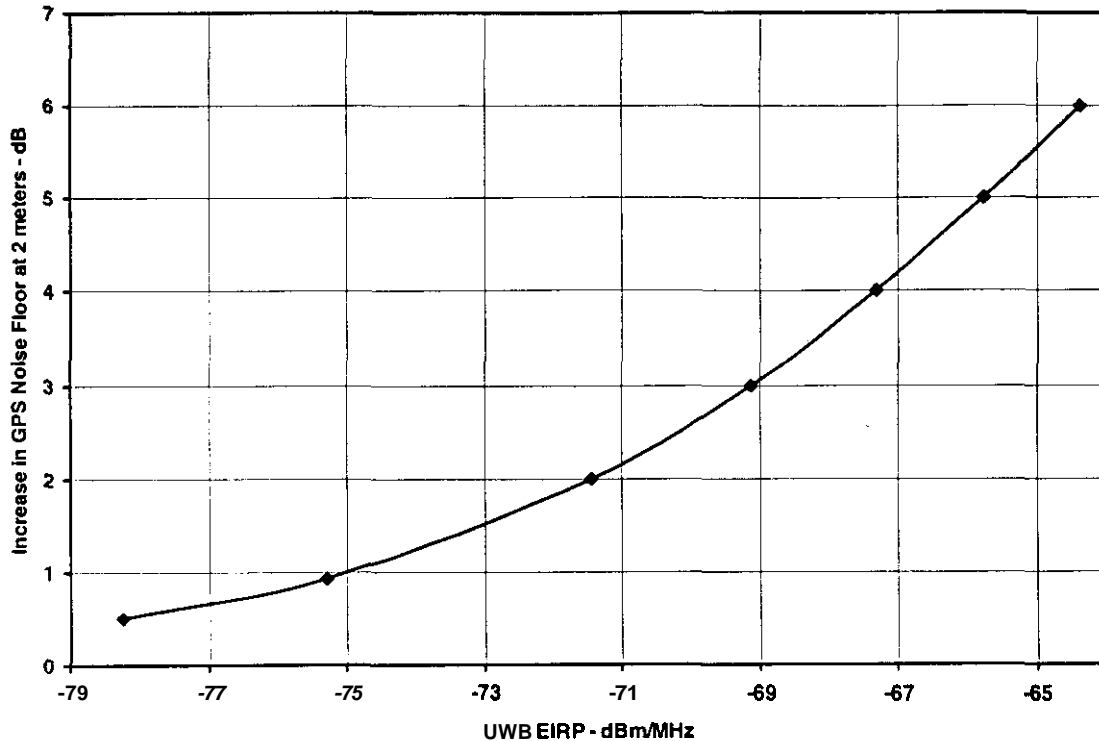
$$N_{0, \text{total}} \approx 10 \log_{10} \left[ kT_s + kT_0 (10^{1NF} - 1) + 10^{1N_i} \right]$$

---

<sup>1</sup> B. W. Parkinson and J. J. Spilker, Jr., Editors, Global Positioning System: Theory and Applications I, Chapter 8, pp. **343-344**, AIAA, **1996**.

**ATTACHMENT C**  
**NOISE FLOOR ANALYSIS**  
(Continued)

where  $N_i$  is the interference noise density in dBW/Hz. To have a negligible impact, this interference noise density should be 6 dB less than the -111.5 dBm/MHz thermal noise density. Obviously, at 2 meters distance, the overall noise floor will be raised (about 1 dB for the NPRM emission level of -75.3 dBm/MHz). Figure 1 shows the increase in noise floor as a function of emission level. This increase in noise floor is consistent with that derived by the GPS Joint Program Office.



**Figure 1. Rise in Noise Floor as a Function of UWB Emission Limit**

It is also important to note that this degradation in noise floor does not just apply to the GPS C/A Code. The same degradation also applies to the GPS military P Code.

We can only conclude that UWB emissions universally increases the noise floor for all GPS applications – indoors, outdoors and aviation – and conclude that the UWB emission limits cannot be raised above the already established -105.3 dBW/MHz limit.